IN THE DRAWINGS

Submitted herewith for approval are replacement sheets containing amended Figures 4 and 7. Particularly, Figure 4 has been amended to show protrusion 164 and Figure 7 has been amended to show flow passage 180. No new matter has been added.

Remarks

The Office Action mailed September 16, 2004 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-13 and 15-20 are now pending in this application. Claims 1-20 stand rejected. Claim 14 has been cancelled.

The objection to the drawings under 37 CFR 1.83(a) is respectfully traversed. Submitted herewith for approval are replacement sheets containing amended Figures 4 and 7. Particularly, Figure 4 has been amended to show protrusion 164 and Figure 7 has been amended to show flow passage 180. No new matter has been added. Applicants respectfully submit that every feature of the invention specified in the Claims is shown in the Figures. For the reasons set forth above, Applicants request that the objections to the drawings be withdrawn.

The objection to the Specification is respectfully traversed. Specifically, paragraph 0020 has been amended to recite "guide tubes (not shown)...." Additionally, paragraph 0023 has been amended to recite "reactor pressure vessel 5". Moreover, paragraph 0026 has been amended to recite "core support beams 150 (shown in Figure 4)". Furthermore, paragraph 0030 has been amended to recite "guide tubes 56". For the reasons set forth above, Applicants respectfully request that the objection to the Specification be withdrawn.

The rejection of Claims 1, 5-8, and 13-17 under 35 U.S.C. § 112, first paragraph is respectfully traversed.

Specifically, with regard to Claims 1, 13, and 14, Claim 1 has been amended to recite "at least one removable support plate disposed on said plurality of support beams"; Claim 13 has been amended to recite "at least one removable support plate disposed on said plurality of support beams"; and Claim 14 has been cancelled.

Moreover, with regard to Claim 5, Applicants respectfully traverse the suggestion in the Office Action, at page 4, that "applicant's own admission...state that the specification

fails to disclose how and in what manner the support beams comprise a protrusion extending along a length thereof or how and in what manner one protrusion may be received by more than one groove." Specifically, Applicants do not admit that the Specification fails to disclose how and in what manner the support beams comprise a protrusion extending along a length thereof and how and in what manner one protrusion may be received by more than one groove. Rather, Applicants respectfully submit that one skilled in the art, after reading the Specification in light of the Figures, would understand the steps described in the Specification referring to machining mating grooves or protrusions into core support beams, as recited in paragraph 0026. Additionally, Applicants respectfully submit that one skilled in the art, after reading the Specification in light of the Figures, would understand the steps described in the Specification referring to receiving the protrusions within the grooves of the core support plate, as recited in paragraph 0026.

Furthermore, with regard to Claims 5 and 14, Claim 5 has been amended to recite "[t]he apparatus according to Claim 1 wherein each of said plurality of support beams comprise a protrusion extending along a length thereof, said protrusion receivable within said at least one groove"; Claim 14 has been cancelled.

Additionally, with regard to Claims 6 and 15, Applicants respectfully traverse the suggestion in the Office Action, at page 4, that "the specification fails to disclose how and in what manner one support plate comprises only one support plate flow passage." Specifically, Claims 6 and 15 recite "said at least one removable support plate comprises at least one support plate flow passage." The Specification, at page 4, recites "[r]emovable core support plate 100 has at least one coolant flow passage 108...", and Figure 2 illustrates an embodiment of a removable core support plate having at least one coolant flow passage. Applicants respectfully submit that one skilled in the art, after reading the Specification in light of the Figures, would understand that at least one coolant flow passage could include, for example, eight coolant flow passages, as illustrated in Figure 2, or, in an alternative removable core support plate, one skilled in the art would understand that at least one coolant flow passage could include, for example, one coolant flow passage.

Additionally, with regard to Claims 7 and 16, Applicants respectfully traverse the suggestion in the Office Action, at page 4, that "the specification fails to disclose how and in what manner one support plate comprises only one support block and how only one support block flow passage may have flow communication with more than one support plate flow passage." Specifically, amended Claim 7 recites "said at least one removable support plate comprising at least one removable support block disposed thereon, said removable support block having at least one support block flow passage in flow communication with one of said at least one support plate flow passage." Additionally, amended Claim 16 recites "said at least one removable support plate comprises at least one removable support block disposed thereon, said at least one removable support block comprising at least one support block flow passage in flow communication with one of said at least one support plate flow passage."

The Specification, at page 6, recites "Figure 6 is a perspective view of at least one fuel support block 170 removably mounted to core support plate 100", and Figure 6 illustrates an embodiment of a removable core support plate having at least one support block removably mounted to the core support plate. Applicants respectfully submit that one skilled in the art, after reading the Specification in light of the Figures, would understand that at least one removable support block could include, for example, four removable support blocks, as illustrated in Figure 6, or alternatively, one skilled in the art would understand that at least one removable support block could include, for example, one removable support block.

Moreover, with regard to Claim 8, Claim 8 has been amended to recite "[t]he apparatus according to Claim 7 wherein said removable support block comprising at least one flow inlet portion extending from one side of said removable support block, said at least one flow inlet portion providing flow communication to one of said at least one support block flow passage, said at least one flow inlet portion receivable within one of said at least one support plate flow passage."

Furthermore, with regard to Claim 17, Claim 17 has been amended to recite "[t]he nuclear reactor according to Claim 16 wherein said at least one removable support block comprises at least one inlet flow projection extending from one side of said at least one removable support block and at least one flow outlet extending on an opposite side of said at

least one removable support block, said at least one inlet flow projection receivable within one of said at least one support plate flow passage."

Accordingly, for the reasons set forth above, Applicants respectfully request that the rejection of Claims 1, 5-8, and 13-17 under Section 112, first paragraph, be withdrawn.

The rejection of Claims 5 and 9 under 35 U.S.C. § 112, second paragraph is respectfully traversed.

Specifically, Claim 5 has been amended to recite "each of said plurality of support beams...." Antecedent basis for the plurality of support beams can be found in Claim 1 from which Claim 5 depends. Moreover, Applicants respectfully submit that Claim 9 does not recite "quick tube opening" as asserted in the Office Action. However, Applicants have amended Claim 10 to recite a "guide tube opening".

For the reasons set forth above, Applicants respectfully request that the Section 112 rejections of Claims 5 and 9 be withdrawn.

The rejection of Claims 1-6 and 13-15 under 35 U.S.C. § 102(b) as being anticipated by Anthony (U.S. Patent No. 4,127,445) is respectfully traversed.

Anthony describes a lower core support structure (18) for a nuclear reactor (10). The support structure includes a plurality of support beams (19 and 21) forming a grid network of support beams. Metal pads (22) and alignment pins (23) are welded to the upper surface of the support beams. Fuel assemblies (16) are supported and aligned by the pads and pins. A portion of the fuel assemblies, namely a lower end fitting (38) rests on the pads. Specifically, alignment posts (60) extend downward from a lower end plate (54), and a bottom surface of the alignment posts rest on the top surface of the pads. Notably, the alignment posts do not contact the support beams.

Claim 1 recites an apparatus for supporting fuel assemblies in a reactor pressure vessel including a core, wherein the apparatus includes "a plurality of support beams...at least one removable support plate disposed on said plurality of support beams, each said

removable support plate comprising at least one groove configured to mate with one of said plurality of support beams."

Anthony does not describe nor suggest an apparatus for supporting fuel assemblies as recited in Claim 1. More specifically, Anthony does not describe nor suggest an apparatus having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Specifically, alignment posts extend downward from a lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top surface of the pads. Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony.

Claims 2-6 depend from independent Claim 1. When the recitations of Claims 2-6 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-6 likewise are patentable over Anthony.

Claim 13 recites a nuclear reactor including "a reactor pressure vessel...a reactor core located inside said reactor pressure vessel...a core plate located inside said reactor pressure vessel, said core plate including a plurality of support beams; and at least one removable support plate disposed on said plurality of support beams, each said removable support plate comprising at least one groove configured to mate with one of said plurality of support beams."

Anthony does not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Anthony does not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Specifically, alignment posts extend downward from a lower end plate of the fuel assemblies and a bottom surface of the alignment posts rest on a top

surface of the pads. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Anthony.

Claims 14-15 depend from independent Claim 13. When the recitations of Claims 14-15 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 14-15 likewise are patentable over Anthony.

For the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1-6 and 13-15 be withdrawn.

The rejection of Claims 9 and 12 under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent 62-5197 ("62-5197") is respectfully traversed.

As best understood by Applicants, 62-5197 describes a support assembly (16) for supporting a fuel assembly (8) and providing fluid flow to the fuel assembly. Specifically, the support assembly extends between adjacent support pieces (10). Each support piece includes a guide tube opening (12) and flow passages (13) extending therethrough. The support assembly is coupled to the flow passages of adjacent support pieces. The support assembly also includes a fuel assembly opening (9) configured to couple with and support a fuel assembly.

Claim 9 recites a support plate including "a top surface...a bottom surface spaced apart from said top surface by a thickness, said bottom surface having at least one groove configured to locate said support plate along corresponding support beams...a guide tube opening through said thickness...at least one flow passage through said thickness."

62-5197 does not describe nor suggest a support plate as recited in Claim 9. More specifically, 62-5197 does not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening

configured to be coupled to and support a fuel assembly. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over 62-5197.

Claim 12 depends from independent Claim 9. When the recitations of Claim 12 are considered in combination with the recitations of Claim 9, Applicants respectfully submit that dependent Claim 12 likewise is patentable over 62-5197.

For the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 9 and 12 be withdrawn.

The rejection of Claims 1-9 under 35 U.S.C. § 103 as being unpatentable over Anthony in view of 62-5197 is respectfully traversed.

Anthony and 62-5197 are described above.

Anthony and 62-5197, alone or in combination, do not describe nor suggest an apparatus for supporting fuel assemblies as recited in Claim 1. More specifically, Anthony and 62-5197, alone or in combination, do not describe nor suggest an apparatus having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly. Accordingly, for the reasons set forth above, Applicants submit that Claim 1 is patentable over Anthony and 62-5197, alone or in combination.

Claims 2-8 depend from independent Claim 1. When the recitations of Claims 2-8 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 2-8 likewise are patentable over Anthony and 62-5197, alone or in combination.

Anthony and 62-5197, alone or in combination, do not describe nor suggest a support plate as recited in Claim 9. More specifically, Anthony and 62-5197, alone or in combination, do not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over Anthony and 62-5197, alone or in combination.

Further, Applicants submit that it would be obvious to modify the teachings of Anthony with the teachings of 62-5197. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify Anthony using the teachings of 62-5197. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Anthony and 62-5197, alone or in combination, describe nor suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Anthony with 62-5197 because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991).

In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-9 be withdrawn.

The rejection of Claims 10 and 11 under 35 U.S.C. § 103 as being unpatentable over Anthony in view of 62-5197, and further in view of Berglund et al. (U.S. Patent Number 3,888,732) ("Berglund") is respectfully traversed. The Office Action references U.S. Patent Number 3,888,372 to Berglund et al. as a prior art reference basis for a Section 103 rejection. Applicants believe the reference should be 3,888,732. Specifically, U.S. Patent Number 3,888,732 recites Berglund et al. as the inventor, whereas U.S. Patent Number 3,888,372 recites Gorby et al. as the inventor. Accordingly, this response is based on the 3,888,732 reference to Berglund et al.

At least for the reasons explained above, Claim 9 is patentable over Anthony and 62-5197, alone or in combination. Berglund describes a nuclear reactor having fuel assemblies (1) positioned on supporting members (6) and control rods (7) arranged in guide tubes (8) between fuel rods (2) inside the fuel assemblies. The supporting members are secured in and supported by the bottom wall of the tank.

Anthony, 62-5197, and Berglund, alone or in combination, do not describe nor suggest a support plate as recited in Claim 9. More specifically, Anthony, 62-5197, and Berglund, alone or in combination, do not describe nor suggest a support plate including a bottom surface having at least one groove configured to locate the support plate along a support beam. Rather, in contrast to the present invention, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, 62-5197 describes a support assembly for supporting a fuel assembly, wherein the support assembly coupled to flow passages of adjacent support pieces, and wherein the support assembly includes a fuel assembly opening configured to be coupled to and support a fuel assembly, and Berglund merely describes a nuclear reactor having fuel assemblies positioned on supporting members

which are secured in and supported by the bottom wall of the tank. Accordingly, for the reasons set forth above, Applicants submit that Claim 9 is patentable over Anthony, 62-5197, and Berglund, alone or in combination.

Claims 10 and 11 depend from independent Claim 9. When the recitations of Claims 10 and 11 are considered in combination with the recitations of Claim 9, Applicants respectfully submit that dependent Claims 10 and 11 likewise are patentable over Anthony, 62-5197, and Berglund, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 10 and 11 be withdrawn.

The rejection of Claims 13-18 under 35 U.S.C. § 103 as being unpatentable over Chaki et al. (U.S. Patent 6,141,397) ("Chaki") in view of Anthony is respectfully traversed.

Anthony is described above. Chaki describes a boiling water reactor having a plurality of fuel assemblies (2). Upper end portions of the fuel assemblies are supported by an upper lattice plate (4) fixed to a core shroud (3). A core lower portion supporting plate (6) is mounted to the core shroud and is positioned at a lower end portion of the core. Control rods (11) are inserted between the fuel assemblies through guide pipes (5). Fuel support pieces (10) are arranged on a top portion of the control rod guide pipes. The fuel assemblies are coupled to insertion holes (10a) in the fuel support pieces. The load of the fuel assemblies is supported by a bottom plate (8a) by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate. Orifices (10b) are defined in the side walls of the fuel support pieces for directing coolant to the insertion holes.

Chaki and Anthony, alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Chaki and Anthony, alone or in combination, do not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, Chaki describes a boiling water reactor including fuel support pieces

arranged on a top portion of control rod guide pipes and coupled to corresponding fuel assemblies, wherein the load of the fuel assemblies is supported by a bottom plate by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate, and Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Chaki and Anthony, alone or in combination.

Claims 14-18 depend from independent Claim 13. When the recitations of Claims 14-18 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 14-18 likewise are patentable over Chaki and Anthony, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 13-18 be withdrawn.

The rejection of Claims 19 and 20 under 35 U.S.C. § 103 as being unpatentable over Chaki in view of Anthony, and further in view of Drecker et al. (U.S. Patent 5,943,385) ("Drecker") is respectfully traversed.

At least for the reasons explained above, Claim 13 is patentable over Chaki and Anthony, alone or in combination. Drecker describes a transition piece (32) for insertion into, and directing of coolant from, a passage (40) extending through a core support plate (41). The transition piece includes a rim configured to form a sealing connection with the passage, an enlargement area, and an upper part configured to support fuel assemblies. Coolant is directed through the passage, the transition piece, and into the fuel assemblies.

Chaki, Anthony, and Drecker, alone or in combination, do not describe nor suggest a nuclear reactor as recited in Claim 13. More specifically, Chaki, Anthony, and Drecker, alone or in combination, do not describe nor suggest a nuclear reactor having a removable support plate including at least one groove configured to mate with a support beam. Rather, in contrast to the present invention, a boiling water reactor including fuel support pieces

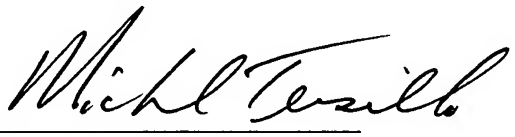
arranged on a top portion of control rod guide pipes and coupled to corresponding fuel assemblies, wherein the load of the fuel assemblies is supported by a bottom plate by transferring the load through the fuel support pieces, into the control rod guide pipes, and eventually to the bottom plate, Anthony describes a support structure having a plurality of support beams, metal pads, and alignment pins, wherein fuel assemblies are supported and aligned by the pads and pins, and Drecker merely describes a transition piece for insertion into, and directing of coolant from, a passage extending through a core support plate. Accordingly, for the reasons set forth above, Applicants submit that Claim 13 is patentable over Chaki, Anthony, and Drecker, alone or in combination.

Claims 19 and 20 depend from independent Claim 13. When the recitations of Claims 19 and 20 are considered in combination with the recitations of Claim 13, Applicants respectfully submit that dependent Claims 19 and 20 likewise are patentable over Chaki, Anthony, and Drecker, alone or in combination.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 19 and 20 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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